

**Hydrology – Assignment No. 4****2<sup>nd</sup> Year Civil Eng. 2016/2017**

1. Given an initial infiltration capacity of 8.2 cm/hr and a time constant  $k$  of 0.28 hr. Using Horton equation, derive an infiltration capacity versus time curve if the ultimate infiltration capacity is 1.32 cm /hr. For the first 8 hours, estimate the total volume of water infiltrated in inches over the watershed if the area is 130  $Km^2$ .
2. Consider a soil with porosity  $n = 0.33$  and suction  $\psi = 10.0$  cm. Before the rainfall event, the initial moisture content  $\theta_i$  was 0.31. It is known that after 1 hr of rainfall, the total infiltrated water was 2.1 cm. Estimate the total infiltration amount 1.5 hr after the beginning of the storm.
3. The rates of rainfall for the successive 4 hours period of a 28-hour storm are shown in the following table. The corresponding surface runoff is estimated to be 14.2 cm. Establish the  $\phi$ -index.

Time (hr)	0 – 4	4 – 8	8 – 12	12 – 16	16 – 18	18 – 24	24 – 28
Rainfall (in/hr)	0.0	0.42	0.62	0.81	0.97	0.41	0.18

4. Use the Green-Ampt equation to evaluate the infiltration rate and cumulative infiltration depth for a Silty clay Loam at 0.2 hr increments for the first hour and the 0.5 hr increments for six additional hours. The initial effective saturation is 27percent and assume ponding.